XXIII. *On Systems and Methods in Natural History. By J. E. Bicheno, Esq., F.R.S., Sec. L.S.*

Read June 4, 1826.

I PROPOSE to myself on the present occasion to make some observations on Systems and Methods in Natural History; a subject of great importance at all times, but more especially so at present, when new views of arrangement and nomenclature are proposed, and to some extent adopted. Let me not be understood, however, in the general observations which follow, to be opposed to any particular system; my object being to discuss the first principles of arrangement, and to leave others to judge how far they are applicable to the views adopted by any individual systematist.

It has appeared to me that the difficulties of the subject have not been duly appreciated; and the time cannot be unprofitably occupied, if I accomplish no more than to enable us to estimate them. It might even be suspected, from the readiness with which new systems are adopted, that they have a peculiar attraction for ardent minds; as it has not unfrequently happened that young naturalists have found themselves prematurely embarrassed in a subject, which of all others requires not only an extensive acquaintance with the operations of the human mind, but long experience and various practice. The line of argument I propose to employ, must necessarily be somewhat abstract; yet I hope I shall be borne with, since the practical naturalist could

make no accumulations to his science, and all his particulars would stand unconnected and discrepant throughout, without the aid of abstract reasoning. Besides, I am anxious to engage the attention of persons accustomed to turn their observations to the operations of the human mind, and to the instruments which it employs to perform its labours; feeling assured that, by obtaining the cooperation of this class of philosophers, we shall have great light thrown upon our subject; and that it will be one means of attracting the notice of those who delight in a large and liberal treatment of science. While they impart to us a philosophical solidity, in which I am apprehensive we are wanting, we may hope to communicate to them a reciprocal benefit, in some of those graces and charms to be derived from the study of Nature, and in which perhaps they may be deficient.

Without undervaluing the study of species, upon which a great deal of our knowledge is built, it cannot be denied that naturalists in general have been too often content with assigning them names, and a place in the systems they have adopted; and this they have done without having an ulterior view to their structure and functions, and the relations subsisting amongst them. Much less have they kept in view the end of generalizing the particulars they are accumulating; but they continue to heap together a "*rudis indigestaque moles*," until they are actually overwhelmed by their materials. To build up science skilfully, the combination should go on with the collecting, or the superstructure will exhibit neither use nor beauty.

Mr. Roscoe has clearly illustrated the comparative merits of the artificial and natural arrangements in Botany in a former volume of the Transactions*; and has satisfactorily proved, in my estimation, that however admirable and comprehensive the system of Jussieu may be, yet it ought not to supersede the

* *Trans. Linn. Soc.* vol. xi. p. 50.

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use of the Linnæan arrangement. The two great masters of botanical science propose different ends, and ought not to be regarded as rivals. The President of this Society has also constantly pressed upon the attention of the student the same important fact.

In some respects it is not to be regretted that the absolute sway which the name of Linnæus has had among English naturalists is somewhat abated: for although authority is an extremely useful bond of union, and has in this instance established among us a nomenclature which nothing short of homage to the founder could probably have made current, yet it has brought with it the ordinary evils attendant upon great names. The range of the pupil has been limited by that of the master; and it has been considered a species of heterodoxy to dissent from the established opinions. The danger to be now apprehended is, that those who adopt other arrangements will forget the advantages to be derived from what is old, in their love of that which is new.

In addition to the remarks made by Mr. Roscoe and the President, I would beg leave to suggest to those who adopt new systems,—and in adopting them think it advisable to break up the old orders and genera into many new ones,—that the artificial and natural systems aim at two very distinct objects, which are in some measure incompatible with each other. The one is to make us acquainted with individuals: and the other, founded upon an acquaintance with individuals, to combine them according to their characters, so as to abridge the labour of reasoning, and to enable us to ascend from particular to general truths.

In order to assist us in these investigations, we employ certain words in a peculiar sense. Thus the word *Species*, when used by naturalists, has a more confined signification than the same word when employed in scholastic language. We have agreed that a species shall be that distinct form originally so created,

and producing by certain laws of generation others like itself: whereas all that logicians have meant, is a number of objects bearing a certain resemblance to one another, and on that account denominated by a single appellation, which may be employed to express any one of them. This term is the creature of art, to help us up the first step of generalization. By its assistance we propose to reason upon all the individuals conforming to the law we have laid down, as safely as we can do of any one of them. There is this inconvenience attending the use of it by naturalists, that it assumes as a fact, that which in the present state of science is in many cases a fit subject of inquiry; namely, that species, according to our definition, do exist throughout nature. It is too convenient a term to be dispensed with, even as an assumption; only care should be taken that we do not accept the abstract term for the fact.

It might, for instance, be proposed as a legitimate question, whether the species of some familiar genera, such as *Rosa*, *Rubus*, *Saxifraga*, do not run into one another by imperceptible shades, unappreciable by human sense, in the same manner as certain genera melt and intermingle their characters, so as to render it impossible to circumscribe them. Indeed, the extent to which species-making has been carried in modern times, almost leads to this conclusion. Visible and palpable distinctions are in many cases no longer relied on; and there are many acute naturalists, who, without bringing the subject to the test of experiment, are content to rely on those empirical characters, which can only be perceived by long and familiar experience, and cannot be described by words. The truth is, that all sensible objects have characters which leave impressions upon the mind, without our being capable of embodying them in language. We are all aware of this when we speak of tastes, and tints, and the countenances of our friends. Every-body perceives them, yet nobody can

can communicate to his neighbour his perception of their differences. Thus botanists speak of certain species of plants differing in appearance, habit, touch, &c.; by which they often mean that they have some indescribable peculiarities about them, which point them out to the practised observer as distinct. A great number of such species may be detected in every modern Flora of a well investigated country; but whether they deserve to be ranked among those which are capable of definition, is a question of great doubt:—that the practice is an inconvenience, none will deny; and if it be much longer continued, will involve in inextricable difficulty all our well known species, make us dependent upon empirical and traditional evidence for our acquaintance with them, and render it impossible to derive instruction from books. In such cases the assumed law ought to be brought to the test of experiment, or the species should be rejected.

Many of our cultivated plants also tend to invalidate the law. Who can refer our *cerealia* and esculent vegetables, in many instances, to their true types? and how few of our old flowers are there, of which the astutest botanist can trace the origin! Domesticated animals afford a still more striking example; and man himself furnishes the most difficult problem of all.

These remarks and examples are, I apprehend, sufficient to show how difficult it is to adopt the term in its strict acceptation; and that however precisely the naturalist has attempted to employ it, he has not succeeded to the extent he has proposed; and that it can only be taken as correct in a vague and general sense, and as a convenient abstraction to relieve him at the first step from the necessity of becoming acquainted with every individual.

The next term of importance to the naturalist upon which the accuracy of his reasoning depends, is that division of his system which he denominates a *Genus*. This is an assemblage of individuals agreeing also in some common characters; but, unlike the

the word species, it is not previously defined. Thus much indeed has been thought requisite; that in botany these common characters should be taken from the parts of fructification, and in zoology from such parts as are indicative of structure and habits. "A genus should furnish a character, not a character form a genus." We are not here, as in the word species, precluded from inquiry by a previous definition. Though both words are terms of generalization, there is the same difference between them, as instruments of reasoning, as between a definition and a proposition in geometry.

The species includes all the characters which are in the genus, and those likewise which distinguish that species from others belonging to the same genus; and the more divisions we make, as order, family, class, it is intended that the names of the lower should become still the more comprehensive in their signification, but the less extensive in their application to individuals. Naturalists by this invention, which is not exclusively their own, have it in their power to contemplate and reason upon these separate characters, with all their consequences, as if they existed independently of species; as by the use of the word species they are enabled to look at their peculiar attributes independently of individuals. This faculty of the mind, which is one of the most curious that belongs to it, has given rise in all languages to a multitude of words of the same kind as the names of genera in Natural History; words, which do not express individual existences, but are abstractions of qualities and characters belonging to them*.

All general reasoning in morality, law, politics, and even mathematics, depends for its accuracy upon the proper use of ge-

* I would avoid here, and leave the question to be decided by the reader, after he has consulted Locke and Berkeley, whether we have got ideas corresponding to these abstract terms, or whether they are mere signs, like x, y, and z in algebra.

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neric and other abstract terms. In mathematics they admit of exact (or I would rather say more exact) previous definition; and hence arises the accuracy of deductions the most recondite and remote in that science. In the other sciences, which are of a speculative and contingent nature, these terms are employed not with the same precision, but seem to be the result of our necessities, borrowed from sensible objects and analogy, and frequently indeed from accidental coincidences. They derive their force rather from the character of the mind that employs them, than from any exact definition they may have received; and it seems impossible to make men use such words in a common acceptation. Hence it is, I apprehend, that knowledge of a speculative kind so soon finds its limits; and where at its outset it has promised such glorious results to mankind, as long as it floated in general propositions, the same subject eludes the grasp of the human faculties when it is attempted to be reduced to exactness, and leaves something always to be desired. We are constantly approximating to the truth, yet never reaching it.

It is sometimes asserted, but not correctly, that Natural History, by the aid of its terms, partakes of the nature of mathematical truth; or that it lies intermediate between that science and speculative knowledge. The situation of the naturalist is rather this. He finds himself placed amidst an infinite number of unknown particulars; and in order to facilitate an acquaintance with them, he at once, without regarding individuals with much minuteness, throws together a number of them, which he calls a species, according to an assumed hypothesis. These he attempts again to combine by certain external characters, and calls them a genus. By these means he is enabled to contemplate and treat of them, without being utterly bewildered in the labyrinth of unarranged individuals. Classification is his *filum Ariadneum*. It was but imperfectly understood by the ancients; and has enabled

enabled the moderns to arrive at conclusions with much more expedition than they, and with equal safety. It does that at once which is constantly going on in ordinary language,—the modifications of it to express the classes of external objects. The invention of new terms suited to express new ideas in an abridged and compressed form, is a slow process, and in most cases is the result of convenience. There is no convention to attain the object, because nobody can arrest the subtile means that are employed. But the naturalist being without terms, or at most with so few that they are within his power, attempts to anticipate the slow process usually working in language, and forms at once his instruments of reasoning; and systems and methods can be regarded as no further useful, than as they are assimilated to the ordinary process of abridging the labour of thought adopted by mankind in other subjects of a like nature.

Naturalists err greatly who imagine they are employing terms possessing some new and distinct properties; whereas all they can do is to hold the subjects of natural history together in a loose manner by the use of the words *species*, *genus*, *order*, and *class*; thus presenting certain characters to the mind as separate objects of contemplation by means of abstract terms, of a similar though somewhat more precise import than those which are employed by the rest of mankind in treating general subjects. A stricter use may be made of these words by naturalists than by metaphysicians, because the business of the one is to examine characters and qualities more nicely than the subjects entertained by the other will admit of. Nevertheless, the one cannot employ these abstractions as instruments of reasoning in a different sense from the other. There is no magic about them in the hands of a naturalist more than there is in any of the thousand general terms in the mouths of the vulgar. "Rose" and "Grass" were generic names before the flood, and will continue to be so in spite of systems

systems and methods. The naturalist has attempted only to carry this necessary operation of the mind somewhat further and with more precision, and has thus exposed himself to errors, which the vulgar have escaped. Thus, although there are but two modes of reasoning; namely, by the use of words expressive of an individual and its attributes, or by general words indicative of an aggregation of individuals with their common attributes; yet naturalists have used their terms in a different sense, and have invented additional ones, such as *order*, *tribe*, *cohort*, *family*, *class*, by which they attempt to express with more accuracy larger generalizations than they would do by employing a generic term, and as if they could settle the relative rank of the different groups whose existence they have assumed. Whereas the truth is, that in many instances a class may be equivalent to an order or a genus. These different gradations, thus strictly aimed at, are gratuitous assumptions with which Nature has nothing to do; and which frequently lead to the establishment of false hypotheses.

It was the opinion of Linnæus, and continues to be the opinion of some of his disciples, that genera are actually founded in nature as much as species. "Naturæ opus semper est species et genus." *Phil. Bot.* § 162. "Genus omne est naturale, in primordio tale creatum, hinc pro lubitu et secundum cujuscunque theoriam non proterve discindendum aut conglutinandum." *Ib.* § 159. So the excellent and elegant author of the "Introduction to Physiological and Systematic Botany," says, "A genus comprehends one or more species so essentially different in formation, nature, and often many adventitious qualities from other plants, as to constitute a distinct family or kind no less permanent, and founded in the immutable laws of the creation, than the different species of such a genus. Thus in the animal kingdom a horse, ass, and zebra, form three species of a very

distinct genus, marked not only by its general habit or aspect, its uses and qualities, but also by essential characters in its teeth, hoofs, and internal constitution." It was the circumscribing these insulated assemblages of species that Linnæus regarded as the business of the accomplished naturalist.

Those therefore who use the word *genus* in the Linnæan sense, do not employ it with the same meaning as those who regard genera as merely conventional, and subject to be broken down to suit convenience. The latter would do well to employ some other term, else one great object will be lost at which we are aiming;—the keeping together under some one common head those small assemblages of species which in some instances are so obvious, and so important in enabling us to comprehend and discourse of the scheme of nature.

Whether such insulated groupings really exist, it is for the naturalist to determine, and this can be only inferred from a very extensive knowledge; but as long as we are witnesses to such striking modifications of form as we discover in the genus *Erica*, *Rosa*, *Eriocaulon*, &c., among plants, and in *Vespertilio*, *Strix*, *Scarabæus*, &c., among animals, it would be the height of folly to give up a term so expressive and at the same time so useful, or to transfer its received meaning to some other word which has not been used in the same sense.

As the success of the systematist depends so materially upon the proper use of these abstractions, I shall now proceed to show some distinctions which it is necessary to keep in view while we employ them. We aim, as I said before, at two distinct objects by the use of systems: we use the artificial for becoming acquainted with individuals, and the natural as the means of combining them, and enabling the student to comprehend and speak of the general truths relating to nature by a knowledge of a few particulars.

Division

Division and separation is the end of the artificial system;—to establish agreements is the end of the natural. In one case we reason *à priori;* in the other *à posteriori.* The one is a descending, the other an ascending series. Linnæus understood this distinction when he remarked, "Ordines naturales valent de naturâ plantarum; artificiales in diagnosi plantarum." —"Cavendo in imitando naturam filum Ariadneum amittamus." Nevertheless it has appeared to me that many modern naturalists have not adopted these truths; and that it is the prevalent error of the day to attempt to generalize where they ought to analyse; while their arrangements, called natural, are almost all of them framed with a view to distinguish. Let me not be supposed by these remarks to wish to exclude from the natural system every attempt at diagnosis; for it is obvious, that as the business of the naturalist is to study all the characters, he can no more neglect differences than he can agreements. I only wish to point out the two dissimilar objects we have in view, that they may not be confounded.

M. Decandolle, for instance, whose labours as a systematist are invaluable, seems to overlook this distinction. In his "Regni Vegetabilis Systema Naturale," he starts from things the least known, to reason on things best known. He begins his comprehensive work with a predicate of the stars; and, proceeding downwards to minerals, comes to plants. Here he employs a series of terms expressive of a natural gradation from the highest to the lowest group, attempting fresh combinations at every stage, and making a place for every thing. Thus he has *class*, *sub-class*, *cohort*, *order*, *tribe*, *genus*, *section*, *species*. The extraordinary number of these combinations diminishes their value as a work of natural arrangement. It is a difficulty of sufficient amount to establish a few well marked; and when they are so multiplied, it may be suspected that many of them are arbitrary and artificial.

This attempt at breaking down good orders and genera into many subordinate and loosely defined groups, and encumbering them with names, involves the subject in obscurity, and may well be questioned as contrary to his main design of presenting those comprehensive views which are afforded by a natural system.

Mr. Brown has adopted a different mode in his "*Prodromus.*" He has attempted to combine no further than his knowledge would warrant, not even employing the terms class or order as the names of his groups. As his object is chiefly synthesis, he keeps his diagnostic characters apart, thus leaving the mind less embarrassed when it is in pursuit of analysis. It must be admitted indeed, that his work cannot be employed with any success by the inexperienced, or even by those who have occupied themselves only in searching for species; but to have made it subservient to this purpose, would have been to have rendered it less beautiful and complete as a work of synthesis. His aphorisms and remarks not being reduced to exact method, "are," as Lord Bacon expresses it, "still in their growth, increasing in bulk and substance."

Now wherever the object of the systematist is to enable his reader to discover species, it is necessary to define at every step; and where natural characters do not present themselves, we must adopt artificial ones. For this purpose large classes are formed, many of which are necessarily artificial. These again are broken up into orders, mostly of an artificial character; and thus the naturalist is led step by step from more comprehensive definitions to less, from class to order, from order to genus, and from genus to species. In this descending series it will be observed that the essential feature is the facility that is afforded for definition. Hence the Linnæan system of botany has succeeded so well, because its author selected chiefly as the ground of his arrangement the number and proportion of parts most obvious and least

least liable to vary. His classes and orders are avowedly so many assumptions, which practice has shown to be convenient; but when we come to genera, the artificial system falls in with the natural, as Linnæus framed their characters upon resemblances founded in nature.

Now in the natural system this machinery of terms cannot be employed in the same manner. It is an ascending series from the less to the greater predicate. From genera we proceed upwards to orders, and orders we combine into classes. We become more and more general in our characters, instead of more and more definite. Here indeed we ought not to sacrifice, as in the artificial scheme, to convenience; and break up well-defined genera and orders because they contain a large number of species. If we find a large genus, for instance, as *Erica*, agreeing in some well-marked characters of structure, form, station, and properties, it appears contrary to the end proposed by the natural system, to divide and subdivide the species into small groups, and to give each of these the same value as is now possessed by the whole. This is frittering away characters which are essential to the use of a genus, and destroying our power over it when we proceed to generalise. The value of generic terms consists essentially in the distinct conceptions we have of them; but if we go on to multiply them, as is at present the fashion, we render it as impossible to circumscribe them, as it is to parcel out the colours of the rainbow; and instead of making Natural History familiar and popular, it will require the compass of a man's life to master the terms we employ. If indeed the object be to analyse, division may be very convenient, because the inquirer may be otherwise bewildered in the multitude of particulars. It does not follow from hence that the student of the natural system may not avail himself of subordinate groups by whatever characters they may furnish; only the giving them equivalent names, and making them co-ordinate,

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is destructive, as it appears to me, of his system as a means of general reasoning.

In no department of natural history are the inconveniences arising out of this confusion of analysis and synthesis more felt than in Entomology. The multitude of species included in this kingdom of nature is so great, that it requires the most skilful arrangement to enable the student to determine them: yet it is unquestionably the worst furnished with assistance in this way;—a defect which may be attributed chiefly, I apprehend, to the attempt which both we and our continental neighbours have made to combine the natural with the artificial system. We have aimed at analysis and synthesis at the same time. A comprehensive acquaintance with this infinitely varied tribe can alone enable us to synthesise with safety; and a long period must elapse before we can hope to embrace within our synthesis the whole of the insect world.

In the large views taken by means of the natural system, our business will for ever be the labour of separating what we shall know from that which is unknown. The profoundest knowledge will at last be but a fragment. Some groups of nature are so closely related, that they have been observed from time immemorial. "Whatsoever parteth the hoof and is cloven-footed, and cheweth the cud," comprehends a group of animals so obviously connected, that they must have received a generic appellation from the remotest period. As knowledge has increased, more and more families have been separated: still there is always a remainder of unknown things. Take any natural system, and see if this is not the case. Linnæus in his "Fragments of a Natural Method" professes only to separate from the mass those groups which he saw clearly. Again, his definition of vegetables indicates the same truth: "Vegetabilia comprehendunt Familias septem, *Fungos*, *Algas*, *Muscos*, *Filices*, *Gramina*, *Palmas:*" and then, to include the remainder, he adds, "et *Plantas;*"

Plantas;" defining the last thus, "Plantæ dicuntur reliquæ, quæ priores intrare nequeunt familias." *Phil. Bot.* § 78. Take up Jussieu's "*Genera Plantarum;*" and besides his "Plantæ incertæ sedis," see how he is obliged to dispose at the end of many orders his "Genera affinia," and "Genera nondum satis determinata." This is true inductive philosophy; yet the same author may be suspected of departing from this mode of investigation when he attempts to edge in his remainder under artificial or sweeping characters, as he has done in *Eleagni* and *Junci*, and when, falling in with this modern innovation, he invents a multitude of new orders to embrace every known species of plant.

The mammiferous animals are arranged with more ease according to a natural system, in consequence of their number being comparatively small, and their forms strongly marked. Nevertheless the system of M. Cuvier, in the "*Règne Animal,*" clearly shows the vain attempt of finding a place for every thing. Nothing can be more satisfactory and beautiful than many of his orders and divisions; yet see how he is compelled to change his ground when he comes to the *Pachydermata*, and to huddle together species very remotely connected. His birds also exemplify the same fact, where his order *Passeres* is made to include all that his other orders will not hold. "Son caractère semble d'abord purement négatif, car il embrasse tous les oiseaux qui ne sont ni nageurs, ni échassiers, ni grimpeurs, ni rapaces, ni gallinacés." Thus it contains the Warblers, the Shrikes, the Goatsuckers, the Crows, the Creepers; birds of the most dissimilar habits, and living upon the most dissimilar food. The Chough is separated widely from the *Corvi*, and *Anthus* from *Alauda*. Now this is what we might expect from the nature of the subject; only it is desirable that the remainder of unknown things should be distinctly avowed, and not reduced to an exact place in the natural system. Jussieu's was the most philosophic mode,

mode, which was to place this residue at the end. Linnæus too was very correct when he pronounced his natural orders to be a "Fragment;" and those persons who imagine it to be necessary or advantageous to find a place for every thing, and to divide and split for the purpose of making such places, appear to lose sight of the chief object of the natural system, and to destroy its utility as an instrument of general reasoning.

The French writers in general are prone to combine in their systems the very distinct objects of individualizing and generalizing. They are for ever subdividing where the great aim should be to combine, and thus they detract from the utility of their arrangements for either purpose. It is they who have countenanced the use of *sub-classes*, *cohorts*, *tribes*, *stirpes*, *sub-genera*, and *sub-species;* and they also are the great contributors to the minute division of genera. Strictly speaking, in the natural system we should employ but few terms of the kind alluded to, and those of loose application. For instance, the word *sort* or *group* would as correctly express any natural assemblage of species, as *sub-class*, *race*, *tribe*, *cohort*, or *stirps;* for what do we know of the relative value of the groups attempted to be pointed out by these expressions? And how can we say they are not co-ordinate or commensurate with each other? The great division of cotyledonous plants may, for aught we know, be only equivalent to the order of Grasses; and a genus in some cases seems as distinct as any class, as *Parnassia* and *Linnæa* among plants, and the *Ornithorhynchus* and *Hippopotamus* among animals. Indeed in the recent work of M. Latreille, "*Familles Naturelles du Règne Animal*," he has arranged the monotrematous animals in a class by themselves, and has made two orders; in one case, consisting of a single species, the *Ornithorhynchus paradoxus*, and in the other, of two other species before considered as belonging to that genus. Thus it is, as M. Cuvier remarks, that these animals

mals set at naught all our classification by their osteology and mode of bringing forth.

The adoption of these numerous terms, intended to express fixed ideas, must be looked on with suspicion. The terms *species* and *genus* are too well established by custom, and are so clearly the result of convenience, and moreover conform so closely to the ordinary use of these words, that their utility cannot be questioned; but those numerous subdivisions current among our neighbours, and sensibly increasing among ourselves, may well be doubted as unphilosophical language. To each of them is attempted to be assigned a definite value beforehand, and an impracticable degree of precision; and we deceive ourselves by fancying that we can deal with these delicate and fleeting instruments of thought differently from the rest of the world. But are we to attempt to fetter nature by our systems and terms? "Books should follow sciences, not sciences books," says the immortal Bacon; yet the adoption of systems and technical expressions, which have received their definition beforehand, cannot be employed without the danger of perpetuating false hypotheses, and an apprehension on the part of the ignorant, that these inventions give us some power over nature not belonging to ordinary language.

The more correct mode would be to exclude from the natural method most of these terms, and to employ in their place some convertible words of looser import, as indeed M. Cuvier has to some extent done; such for instance, as group, section, division, to express those larger assemblages of approximations to assigned forms, which are rather predicated than proved; and in many cases to point them out by mere signs, such as are used in printing. Thus, for instance, the word section, or any similar word, might be employed to express the plants severally comprehended in the order *Gramineæ*, the class *Compositæ*, and the

division *Monocotyledones;* and where the characters are less definite, the plants pointed at might be assembled under a simple asterisk.

One chief recommendation of the natural system over the artificial, is the liberty which it leaves to the mind. The one shuts it in to the narrowest scope of observation, while the other suffers it to range in search of all the properties belonging to created beings; their functions, their structure, relations and resemblances, affinities and analogies. It is speculative and general truth that the natural system enables us to pursue; and this will never submit to be bound by any fetters which the art of man can invent. Books after all are but a rude mode of holding knowledge together; and language but an imperfect vehicle to convey with precision the just relations of things. At best it bears the image of the earthy, while things themselves bear the image of the heavenly.

XXIV. *An*